Space Weather Forecast

Issued on Wednesday, 31 July 2024 at 13:23 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Coronal Mass Ejection arrivals expected, most likely Day 1 (31 Jul), with G1-G2 Minor to Moderate storms likely and a slight chance of G3 Strong Storms. Ongoing risk of Moderate and Strong flares.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity is Moderate, five Moderate flares have been observed from across the disc, with the strongest a R2 moderate radio blackout at 30/1938 from a region in the southeast. A highly active disk with fourteen active regions, including four with complex magnetic configurations.

A fast CMEs associated with the R2 flare from the southeast has been assessed as contributing to the risk of a glancing blow into 02 Aug although further modeling ongoing. We await model data on a narrow CME observed leaving the southwest disk approximately 31/0120UTC and a larger CME observed to moving to the west remains under investigation.

Solar Wind / Geomagnetic Activity: The solar environment has been under waning CME influences over much of the last 24 hours due to a CME arrival late on the 29th. Solar winds speeds showed a slow decline from around 500km/s to finish the period at around 400 km/s, though a slight uptick to around 430km/s from 31/1040UTC may signal a further CME arrival. The Interplanetary Magnetic Field, Bt, was initially moderate, but slowly declined weak levels, before a sharp increase back to weakly moderate levels at 31/1040UTC. The north-south component, Bz, was weak throughout. The resulting Geomagnetic activity was Quiet to unsettled (Kp1-3).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) remained at background with no Solar Radiation Storms occurring.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate to High activity is expected with occasional Moderate class flares expected and chance of isolated Strong-class flares.

Solar Wind /Geomagnetic Activity: A number of CMEs have the potential to arrival through the period. The CMEs from early on 28 Jul, and later on 28 Jul are expected to combine to give a single arrival sometime on Day 1 (31 Jul), perhaps already ongoing. Further CME arrival is then possible on Days 2-3 (01-02 Aug), chiefly from a flare on 29 Jul. No recurrent fast wind enhancements are expected, with CME arrivals expected to dominate, bringing spells of slightly elevated to elevated winds, and likely periods of Active to G1-G2 Minor to Moderate Storm conditions. There is a slight chance of G3 intervals, mainly Day 1 (31 Jul).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is likely to rise above background at times in response to any notable flaring that occurs

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in the western disk. This will bring a slight chance of exceeding the S1 Minor Solar Radiation Storm level.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	70	60	30	5
Strong	G3	No	20	10	5	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	90	90	90	90
Very Active	R3 to R5 X	No	25	25	25	25

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	25	25	25	25
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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